64000

HP64000 Logic Development System

Model 64515C PROM Programmer Module

HEWLETT PACKARD

CERTIFICATION

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CW&A 2/81

SERVICE MANUAL

MODEL 64515C

PROM PROGRAMMER MODULE

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SAFETY SUMMARY

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

GROUND THE INSTRUMENT.

To minimize shock hazard, the instrument chassis and cabinet must be connected to an electrical ground. The instrument is equipped with a three-conductor ac power cable. The power cable must either be plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter with the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable meet International Electrotechnical Commission (IEC) safety standards.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE.

Do not operate the instrument in the presence of flammable gases or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.

KEEP AWAY FROM LIVE CIRCUITS.

Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE.

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY INSTRUMENT.

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of the instrument. Return the instrument to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

DANGEROUS PROCEDURE WARNINGS.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

Dangerous voltages, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting.

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SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This manual contains technical information concerning the application, troubleshooting, replacing failed parts, and the theory-of-operation for the Model 64515C PROM Programmer Module as used in the 64000 Logic Development System. The module is shown in figure 1-1.

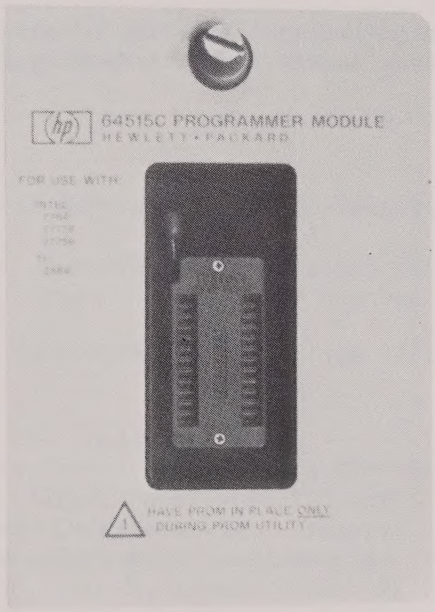


Figure 1-1. Model 64515C PROM Programmer Module

1-3. SAFETY CONSIDERATIONS.

1-4. There are no electrical shock hazards asssociated with the Model 64515C since there are no high voltages present. There are, however, high voltages associated with the 64100A Mainframe and appropriate warnings are given in the Mainframe Tab where these hazards exist.

1-5. INSTRUMENTS COVERED BY THIS MANUAL.

1-6. This manual covers the model 64515C PROM Programmer Module with the 64515-66504 (Rev A) PC board installed. A module manufactured after the printing of this manual may contain a PC board with a later revision letter.

1-7. The manual for a modified module will be accompanied by a "Manual Change" supplement. This supplement will be delivered with each modified module and will contain change information that explains how to adapt this manual to the newer modified module.

1-8. In addition to change information, the supplement will contain information for correcting errors in this manual. To keep this manual as current as possible, Hewlett-Packard recomends that you periodically request the latest manual changes supplement. The supplement for this manual is identified with the model number and manual print date both of which appear on the title page. Complimentary copies of the supplement are available from Hewlett-Packard Sales/Service Office.

1-9. For information concerning the applicability of this manual or the Manual Changes supplement, contact your nearest Hewlett-Packard Sales/Service Office.

1-10. APPLICATION.

1-11. The Model 64515C will program and/or readout the integral EPROMs listed in table 1.

Table 1-1. Applicable EPROM Devices

EPROM	Mfg.	Description
2564	TI	The TMS 2564 is a 65,536 bit, ultraviolet light erasable, electronically programable read—only memory.
2764	Intel	The Intel 2764 is a 65,536 bit ultraviolet light erasable and electronically programable read-only memory.
27128	Intel	The Intel 27128 is a 5v only, 131,072 bit ultraviolet erasable and electronically programmable read-only memory.
27256	Intel	The Intel 27256 is a 262,144 bit ultraviolet erasable and electronically programmable read-only memory.

SECTION II

INSTALLATION AND REMOVAL

2-1. A 50-pin ribbon cable (HP P/N 8120-3346) connects the 64501A Programmer Controller PCB to the 64515C Programmer Module. The cable end with the single connector is connected to the Controller PCB and the end with the double connector is connected to the Programmer Module.

2-2. The cable should be routed across the top of the cardcage and down behind the front panel such that the two connectors are visible in the opening for the programmer module. Connect the cable to the PCB in the Programmer Module using the connector on the extreme end of the cable.

NOTE

The PCB and cable connectors are keyed and fit only one way.

```
********************** CAUTION **************************
*                                                       *
*                                                       *
*  To prevent possible damage to the PROM Programmer    *
*  circuits, turn Mainframe power OFF before install-   *
*  ing or removing the Programmer Module.               *
*                                                       *
*********************************************************
```

SECTION III

OPERATION

The operation of the 64515C is a function of the system software. Complete operation from the keyboard of the system is beyond the scope of the Service Manual. Please refer to the Operator's Manual for the procedure.

```
******************** CAUTION ********************
*                                                *
*  The proper operation of the positive PROM     *
*  programmer requires that a PROM be inserted   *
*  ONLY AFTER the PROM programmer software       *
*  module is called and that the PROM be RE-     *
*  MOVED before the PROM programmer software     *
*  module is exited. Damage to the PROM may      *
*  result if this procedure is not followed!     *
*                                                *
**************************************************
```

NOTE

The PROM programmer software module is called by pressing the "prom_prog" softkey then the Return key. To exit the PROM programmer software module, press the "end" softkey, then the Return key.

SECTION IV

PERFORMANCE VERIFICATION

4-1. INTRODUCTION.

4-2. This section normally contains the information for running the Performance Verification. However, due to the relative low cost of the PROM Programmer PC board, in this module, it is most likely more economical to discard it if it fails than to have the Hewlett-Packard Sales/Service repair it. The basic troubleshooting approach is to first determine if the Prom Controller PC board is at fault, or if the problem is in the module. This is done by using the 64502A PROM Programmer Module in conjunction with the 64501A controller board and running the PROM Performance Verification Tests.

4-3. PROCEDURE.

4-4. If a PROM programming problem is apparent (i.e., you can't sucessfully program and verify a particular PROM chip), perform the following troubleshooting procedure:

a. Turn OFF the mainframe power.

b. Install a 64502A PROM Programmer Module in place of the currently installed 64515C model.

```
******************** CAUTION ********************
*                                                *
*                                                *
*  The Model 64502A PROM Module is the ONLY      *
*  module that is compatible with the PROM       *
*  PV tests. All other models are subject to     *
*  damage due to component overstressing if      *
*  the PV test is attempted with any other       *
*  module installed.                             *
*                                                *
**************************************************
```

c. Turn ON the mainframe power.

d. Refer to Section IV of the 64500S Positive PROM Programmer Tab and run the PV tests described in that Section.

e. If there are no error messages while running the PV test, it is reasonable to assume that this PROM Programmer Module has failed. In this case, refer to the Illustrated Parts Breakdown (figure 4-1) and replace the PC board assembly (HP P/N 64515-66504).

NOTE

Section VIII describes the functions performed by the 64515C PC board.

d. Verify that the problem has been fixed by attempting to program and verify from a PROM chip like the type that was originally causing problems.

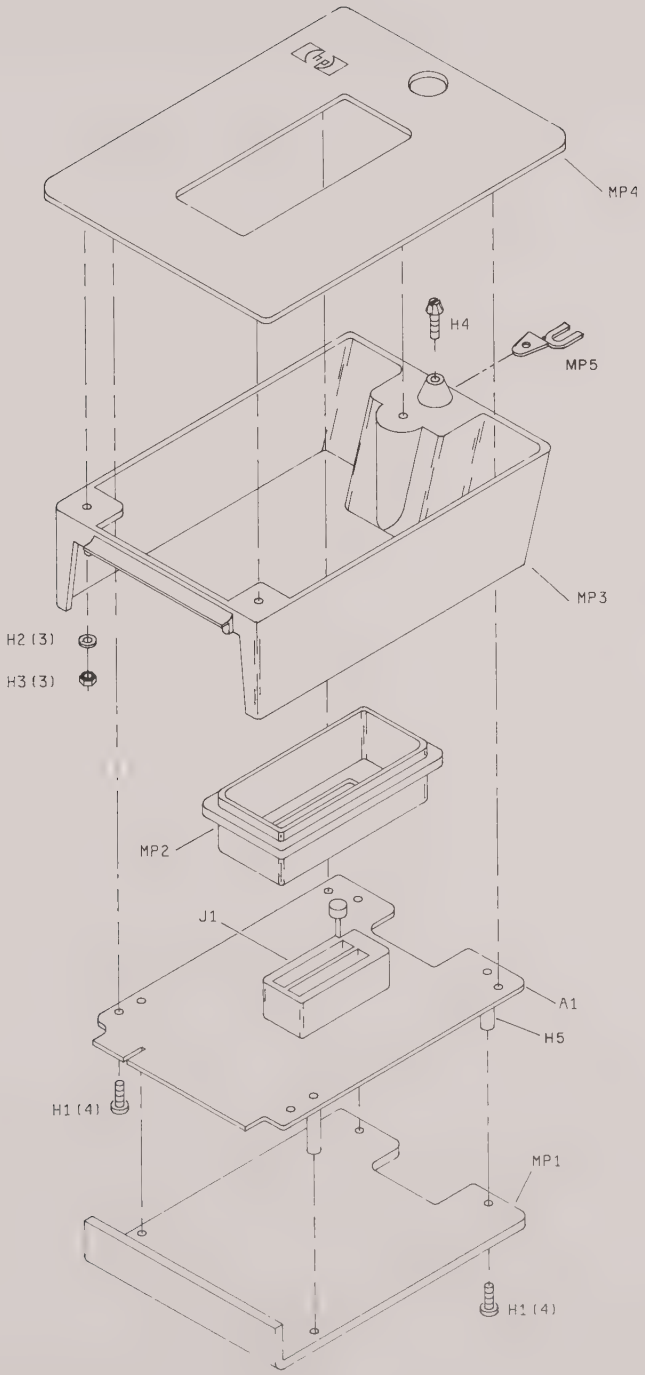


Figure 4-1. Model 64515C Illustrated Parts Breakdown

SECTION V

ADJUSTMENTS

5-1. The 64515C PROM Programmer Module has no adjustments.

SECTION VI

REPLACEABLE PARTS

6-1. INTRODUCTION.

6-2. This section contains information for ordering parts. Table 6-1 lists abbreviations used in the parts list and throughout the manual. Table 6-2 lists all replaceable parts in reference designator order. Table 6-3 contains the names and addresses that correspond to the manufacturers' five-digit code numbers.

6-3. ABBREVIATIONS.

6-4. Table 6-1 lists abbreviations used in the parts list, the schematics and throughout the manual. In some cases, two forms of the abbreviation are used: one all in capital letters, and one partial or no capitals. This occurs because the abbreviations in the parts list are always capitals. However, in the schematics and other parts of the manual, other abbreviation forms are used with both lowercase and uppercase letters.

6-5. REPLACEABLE PARTS LIST.

6-6. Table 6-2 is the list of replaceable parts and is organized as follows:

a. Chassis-mounted parts in alphanumerical order by reference designation.

b. Electrical assemblies and their components in alphanumerical order by reference designation.

c. Miscellaneous parts.

The information given for each part consists of the following:

a. The Hewlett-Packard part number and the check digit.

b. The total quantity (Qty) in the instrument.

c. The description of the part.

d. A five-digit code that indicates the manufacturer.

e. The manufacturer's part number.

The total quantity for each part is given only once - at the first appearance of the part number in the list.

6-7. ORDERING INFORMATION.

6-8. To order a part listed in the replaceable parts table, quote the Hewlett-Packard part number and check digit, indicate the quantity required, and address the order to the nearest Hewlett-Packard Sales/Service office.

6-9. To order a part that is not listed in the replaceable parts table, include the instrument model number, instrument repair number, the description and function of the part, and the number of parts required. Address the order to the nearest Hewlett-Packard Sales/Service office.

6-10. DIRECT MAIL ORDER SYSTEM.

6-11. Within the U.S.A., Hewlett-Packard can supply parts through a direct mail order system. Advantages of using the system are as follows:

a. Direct ordering and shipment from the HP Parts Center in Mountain View, California.

b. No maximum or minimum on any mail order (there is a minimum order amount, for parts ordered through a local HP office when the orders require billing and invoicing).

c. Prepaid transportation (there is a small handling charge for each order).

d. No invoices - to provide these advantages, a check or money order must accompany each order.

6-12. Mail-order forms and specific ordering information are available through your local HP office. Addresses and phone numbers are located at the back of this manual.

Table 6-1. Reference Designators and Abbreviations

REFERENCE DESIGNATORS

A	assembly	F	fuse	MP	= mechanical part	U	= integrated circuit
B	motor	FL	= filter	P	= plug	V	vacuum, tube, neon bulb, photocell, etc
BT	battery	IC	= integrated circuit	Q	= transistor		
C	= capacitor	J	jack	R	= resistor	VR	= voltage regulator
CP	= coupler	K	relay	RT	= thermistor	W	= cable
CR	= diode	L	= inductor	S	= switch	X	= socket
DL	delay line	LS	= loud speaker	T	= transformer	Y	crystal
DS	= device signaling (lamp)	M	meter	TB	= terminal board	Z	= tuned cavity network
E	= misc electronic part	MK	= microphone	TP	= test point		

ABBREVIATIONS

A	= amperes	H	= henries	N/O	= normally open	RMO	rack mount only
AFC	= automatic frequency control	HDW	= hardware	NOM	nominal	RMS	= root-mean square
AMPL	= amplifier	HEX	= hexagonal	NPO	negative positive zero (zero temperature coefficient)	RWV	= reverse working voltage
		HG	= mercury				
BFO	= beat frequency oscillator	HR	= hour(s)				
BE CU	= beryllium copper	HZ	= hertz	NPN	= negative-positive-negative	S-B	slow-blow
BH	= binder head					SCR	= screw
BP	= bandpass			NRFR	= not recommended for field replacement	SE	= selenium
BRS	= brass	IF	intermediate freq			SECT	= section(s)
BWO	= backward wave oscillator	IMPG	= impregnated	NSR	= not separately replaceable	SEMICON	semiconductor
		INCD	= incandescent			SI	= silicon
CCW	= counter-clockwise	INCL	= include(s)			SIL	= silver
CER	ceramic	INS	insulation(ed)	OBD	= order by description	SL	= slide
CMO	= cabinet mount only	INT	internal	OH	= oval head	SPG	= spring
COEF	= coeficient			OX	= oxide	SPL	= special
COM	common	K	kilo=1000			SST	= stainless steel
COMP	composition					SR	= split ring
COMPL	complete	LH	left hand	P	= peak	STL	= steel
CONN	connector	LIN	= linear taper	PC	printed circuit		
CP	= cadmium plate	LK WASH	= lock washer	PF	= picofarads= 10^{-12} farads	TA	= tantalum
CRT	= cathode-ray tube	LOG	= logarithmic taper			TD	time delay
CW	= clockwise	LPF	= low pass filter	PH BRZ	= phosphor bronze	TGL	toggle
				PHL	= phillips	THD	thread
DEPC	deposited carbon	M	milli=10^{-3}	PIV	= peak inverse voltage	TI	= titanium
DR	drive	MEG	= meg=10^{6}	PNP	= positive-negative-positive	TOL	tolerance
		MET FLM	= metal film			TRIM	trimmer
ELECT	= electrolytic	MET OX	= metallic oxide	P/O	= part of	TWT	traveling wave tube
ENCAP	encapsulated	MFR	= manufacturer	POLY	= polystyrene		
EXT	= external	MHZ	= mega hertz	PORC	= porcelain	U	micro=10^{-6}
		MINAT	= miniature	POS	position(s)		
F	farads	MOM	= momentary	POT	potentiometer	VAR	variable
FH	= flat head	MOS	= metal oxide substrate	PP	= peak-to-peak	VDCW	dc working volts
FIL H	fillister head	MTG	mounting	PT	= point		
FXD	= fixed	MY	"mylar"	PWV	peak working voltage	W/	= with
						W	= watts
G	giga (10^{9})	N	= nano (10^{-9})	RECT	rectifier	WIV	working inverse voltage
GE	germanium	N/C	normally closed	RF	= radio frequency		
GL	glass	NE	neon	RH	= round head or right hand	WW	= wirewound
GRD	= ground(ed)	NI PL	nickel plate			W/O	= without

Table 6-2. Replaceable Parts

Ref. Des.	HP Part Number	C D	Qty	Description	Mfr. Code	Mfr. Part Number
A1	64515-66504	9	1	PC BOARD ASSEMBLY	28480	64515-66504
C1	0180-0374	5	1	CF TA 10UF 20V	28480	T110B106K020AS
C2,4	0160-5321	5	2	CF CE .01UF 100V	04222	923CX7R332M100B
C3	0160-5315	0	1	CF CE 3300PF 100V	28480	0160-5315
H1	2360-0113	2	8	MS 6-32 .250LG	28480	2360-0113
H2	3050-0425	3	3	WFL .125 .312 .04	28480	MS15795-804
H3	2260-0009	3	3	NUTH 4-40 .093	28480	511-041800-00-0280
H4	0570-0661	8	1	SCREW-THUMB	28480	0570-0661
H5	0380-0162	1	4	SPRC 6-32 .750	28480	MK6910-3/4-2-14
J1	1200-0870	9	1	ZIF SCKT 28 PIN	19613	228-3345-00-0605
MP1	64500-04101	5	1	COVER-SAFETY	28480	64500-04101
MP2	64500-45205	6	1	BATHTUB 28	28480	64500-45205
MP3	5041-1576	0	1	PANEL-SUPPORT	28480	5041-1576
MP4	64515-00204	8	1	PANEL INTEL 27256	28480	64515-00204
MP5	64500-09101	5	1	GROUND CLIP	28480	00180-09104
R1	0757-0401	0	1	RF .12MF 100	28480	0757-0401
R2	0757-0412	3	1	RF .12MF 365	28480	0757-0412
R3	0757-0420	3	1	RF .12MF 750	24546	CRB14
RP1	1810-0279	5	1	RES NET-4.7K x 9	01121	210A472
RP2	1810-0280	8	1	RES NET-10K x 9	01121	210A103
U1	1820-1416	5	1	IC INVERTER	18324	74LS14
U2	1820-2102	8	1	IC 8 BIT LATCH	18324	74LS373N

Table 6-3. Manufacturers' Codes

Mfr. No.	Manufacturer Name	Address	Zip Code
28480	Hewlett-Packard Corp.	Palo Alto	Ca 94304
01121	Allen-Bradley Co.	Milwaukee	Wi 53204
18324	Signetics Corp.	Sunnyvale	Ca 94086
04222	AVX Ceramics Corp.	Myrtle Beach	SC 29577
19613	Textool Products INC.	Irving	Tx 75060
24546	Corning Glass Works	Bradford	Pa 16701

SECTION VII

BACKDATING

7-1. There is no backdating information applicable to the 64515C PROM Programmer Module at the publication date of this manual.

SECTION VIII

SERVICE

8-1. INTRODUCTION.

8-2. The 64515C PROM Programmer Module provides the electrical interface between the 64501A PROM Programmer Controller and the PROM chip being programmed, verified or read. The PROM programmer circuits are contained on one PC board (HP P/N 64515-66504).

8-3. Figure 8-1, 8-2 and 8-3 are timing diagrams, figure 8-5 is a detailed schematic diagram and figure 8-4 is the component locator for the 64515C PC board.

8-4. THEORY.

8-5. GENERAL. The PROM Programmer circuits provide the following basic functions:

a. Multiplexes via latch U1 the low order address bits to provide 14 address bits (A0 out - A13 out) to the EPROM chip. The Intel 2764 and TMS 2564 use only 13 of the address bits.

   Since the Intel 27128 is a 128K EPROM, an extra address bit is provided (A13) and the Intel 27256 requires 2 extra address bits (A13 and A14) to address its 256K memory locations (8 X 32K).

b. Uses the programming voltage signal (VP3) from the Controller PCB in conjunction with control bits A13 in, A14 in, and LP2 (2564 uses A4 in also) to generate the control signals neccessary to program the EPROM chip.

c. Generates the "1D HEX" ID code (ID0-ID4).

d. Routes "programming" data (DW0-DW7) from the Controller PCB to the EPROM chip.

e. Provides current sinking thru RP2 and current sourcing thru RP1 in the quiescient state for DW0-DW7 and DR0-DR7 data lines.

f. Routes "read" data (DR0-DR7) from EPROM chip back to the Controller PCB during verification and normal reading. It should be noted that the verification of all data programmed into the EPROM takes place after the chip has been programmed and not during the programming sequence.

8-6. ADDRESSING, WRITING and READING CIRCUITS. Thirteen bits of addressing (A0 out - A12 out) are used for selecting any one of the 8192 internal memory locations in the 2564 and 2764 memories. A fourteenth bit A13 out is provided to address the 16K bytes of memory in 27128 EPROM and address bits A13 and A14 out are provided to address the 32K bytes of memory in the Intel 27256 EPROM.

8-7. The low-order bits (A0 out - A7 out) are latched from the Controller PCB using Latch U1 on the 64515C PCB ,then the high-order bits (A8 out - A12 out) are multiplexed with low addresses A0-A4 and bypasses Latch U1 so that thirteen address lines address the EPROM on only eight address lines. The 27128 chip uses A10 in from the EPROM Programmer Controller board for A13 out due to the chip size (16K x 8). The 27256 chip uses also A13 out and A14 out (32K x 8).

8-8. PROM MODULE ID. The final function provided by the 64515C PCB is the generation of the 1D HEX ID code. This is done by grounding ID0, ID2, ID3 and ID4 while tying ID1 to +5 V. Since ID0 is the LSB, this produces 00010 which becomes 11101 since the ID signals are low true. This is equivalent to decimal 29 (1D HEX).

8-9. PROGRAMMING SEQUENCE. In brief, the programming process consists of: 1) activating the program mode, 2) applying the lower 8 bits of address and latching them into U2, 3) applying the upper 5 bits of address via the lower 5 bits A0-A4 (multiplexing 13 bits on 8 lines), 4) appling data and VPP, 5) applying the programming pulse. Each 8-bit word is programmed completely into a specific location before moving on to the next and repeating steps 1 thru 5.

Table 8-1. MODE Selection

MODE	$\overline{CE}$	$\overline{OE}$	$\overline{PGM}$	VPP	VCC	OUTPUTS
Read	V low	V low	V hi	Vcc	Vcc	D out
Standby	V hi	X	X	Vcc	Vcc	High Z
** Program	V low	V hi	V low	Vpp	Vcc	D in
Program Verify	V low	V low	V hi	Vpp	Vcc	D out
Program Inhibit	V hi	X	X	Vpp	Vcc	High Z
X can be either V low or V hi						

**NOTE: There is no "Program" pin on the 27256

Table 8-2. Program/Verify Sequence for the 2564

1. Press the [prom_prog] softkey. Select the 2564 EPROM (softkey).
2. Initial conditions: a) VPP = +1.2 VDC
   b) $\overline{CE}$ = +5 VDC
   c) $\overline{CS1}/\overline{CS2}$ = 0 VDC
   d) $\overline{PGM}$ = 0 VDC
3. Insert EPROM chip into ZIF socket J1.
4. VPP (VP3) gets raised to +5 VDC.
5. Apply address for bit location to be programmed.
6. Latch lower 8 bits of address then pass upper bits of address.
7. Apply data to Bus (bits DW0-DW7).
8. Apply programming power. VPP goes to +21 Volts.
9. $\overline{PGM}$ is the programming signal and is brought low for 50 mS.
10. Lower programming power (VPP goes to +5 VDC).
11. Repeat step 4 through 8 to program remaining data into PROM memory.
12. The Verify Sequence will begin and run through all the previously programmed locations of memory. A failure message will be displayed if any memory location was not programmed correctly.

NOTE

Programmer should be at conditions of step 1 when PROM chip is removed from ZIF socket J1.

Table 8-3. Program/Verify Sequence for the 2764, 27128

1. Press the [prom_prog] softkey. Select the 2764 or 27128 EPROM (softkey).
2. Initial conditions: a) VPP = +1.2 VDC
   b) $\overline{CE}$ = +5 VDC
   c) $\overline{OE}$ = +5 VDC
   d) $\overline{PGM}$ = 0 VDC
3. Insert EPROM chip into ZIF socket J1.
4. VPP gets raised to +5 VDC.
5. Apply address for bit location to be programmed.
6. Latch lower 8 bits of address then pass upper bits of address.
7. Apply data to Bus (bits DW0-DW7).
8. Apply programming power. VPP goes to +21 Volt.
9. $\overline{CE}$ goes low for duration of programming sequence
9. $\overline{PGM}$ is the programming signal and goes low for 1 mS initially.
10. $\overline{OE}$ goes low and a Verify Sequence takes place. If the Verify Sequence fails, the PROM is reprogrammed and a Verify Sequence takes place again. The Programm/Verify Sequence (steps 9 and 10) will occur for up to 15 failures and then drop out of the program mode. When/if the PROM passes the verify test, it then will be programmed X number of times (X = the number of times the PROM went through the program/verify sequence).
11. Lower programming power (VPP goes to +5 VDC).
12. Repeat step 4 through 11 to program remaining data into PROM memory.
13. The Read/Verify Sequence will begin and run through all the previously programmed locations of memory. A failure message will be displayed if any memory location was not programmed correctly.

Table 8-4. Program/Verify Sequence for the 27256

1. Press the [prom_prog] softkey. Select the 27256 EPROM (softkey).
2. Initial conditions: a) VPP = +1.2 VDC
   b) $\overline{CE}$ = +5 VDC
   c) $\overline{OE}$ = +5 VDC
   d) $\overline{PGM}$ = 0 VDC
3. Insert EPROM chip into ZIF socket J1.
4. VPP gets raised to +5 VDC.
5. Apply address for bit location to be programmed.
6. Latch lower 8 bits of address then pass upper bits of address.
7. Apply data to Bus (bits DW0-DW7).
8. Apply programming power. VPP goes to +12 Volt.
9. $\overline{CE}$ is the programming signal and goes low for 1 mS initially.
10. $\overline{OE}$ goes low and a Verify Sequence takes place. If the Verify Sequence fails, the PROM is reprogrammed and a Verify Sequence takes place again. The Programm/Verify Sequence (steps 9 and 10) will occur for up to 15 failures and then drop out of the program mode. When/if the PROM passes the verify test, it then will be programmed X number of times (X = the number of times the PROM went through the program/verify sequence).
11. Lower programming power (VPP goes to +5 VDC).
12. Repeat step 4 through 11 to program remaining data into PROM memory.
13. The Verify Sequence will begin and run through all the previously programmed locations of memory. A failure message will be displayed if any memory location was not programmed correctly.

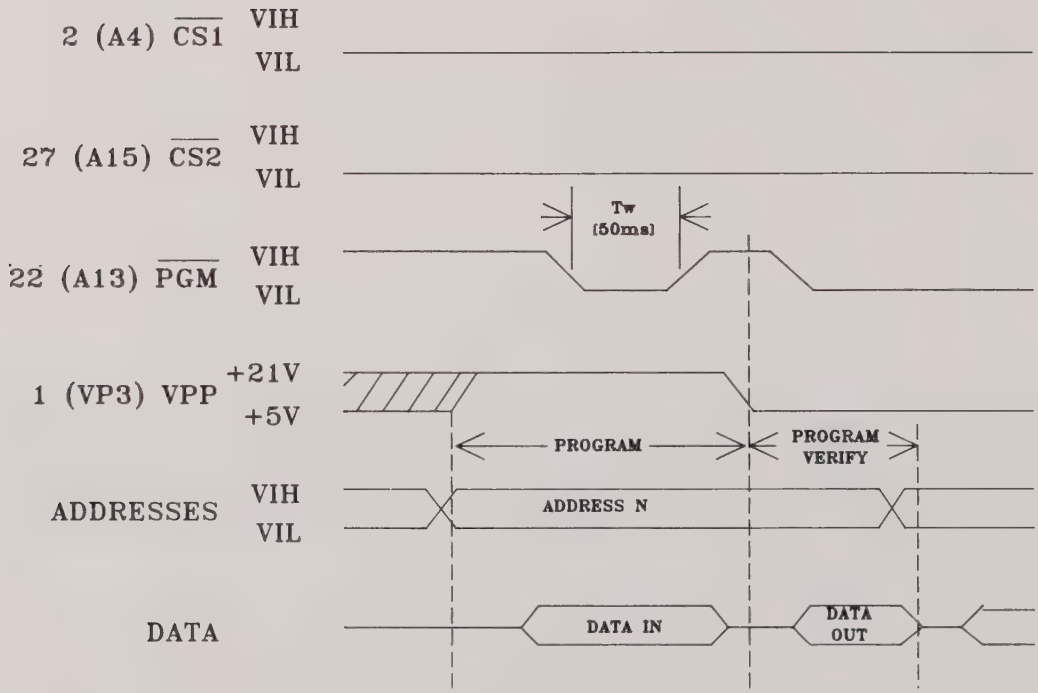


Figure 8-1. Timing Diagram for the 2564

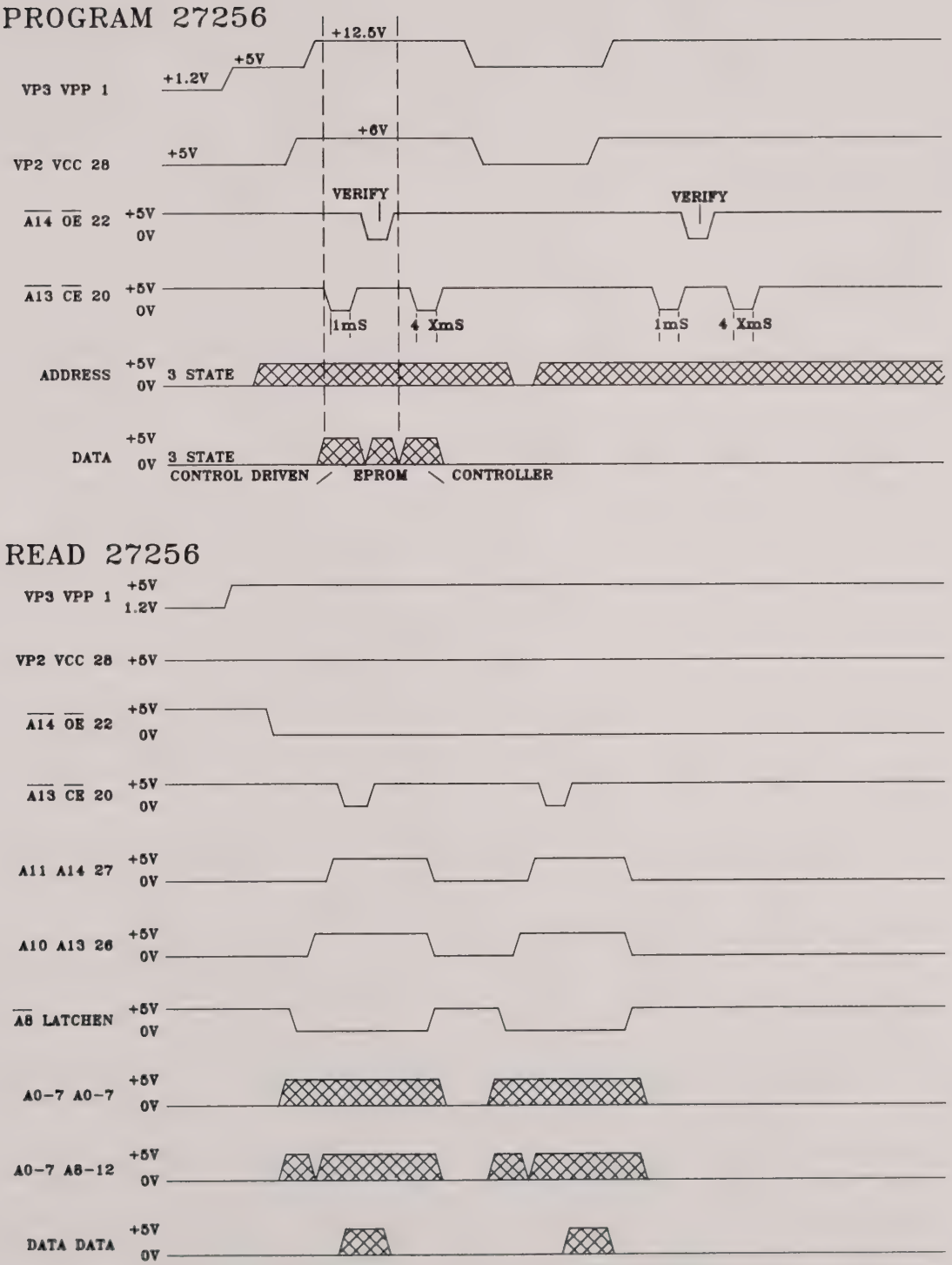
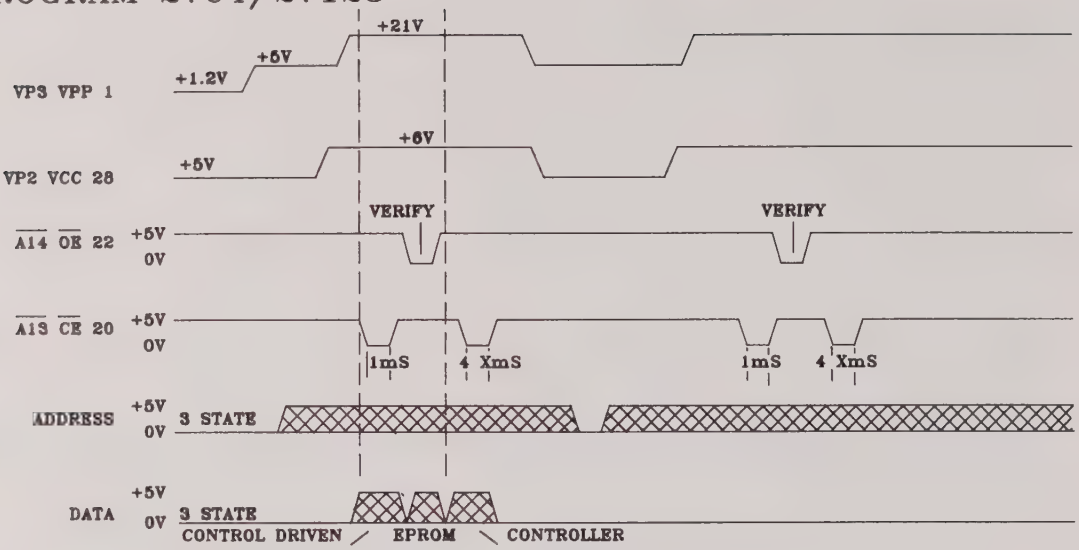


Figure 8-2. Timing Diagram for the 27256

PROGRAM 2764/27128



READ 2764/27128

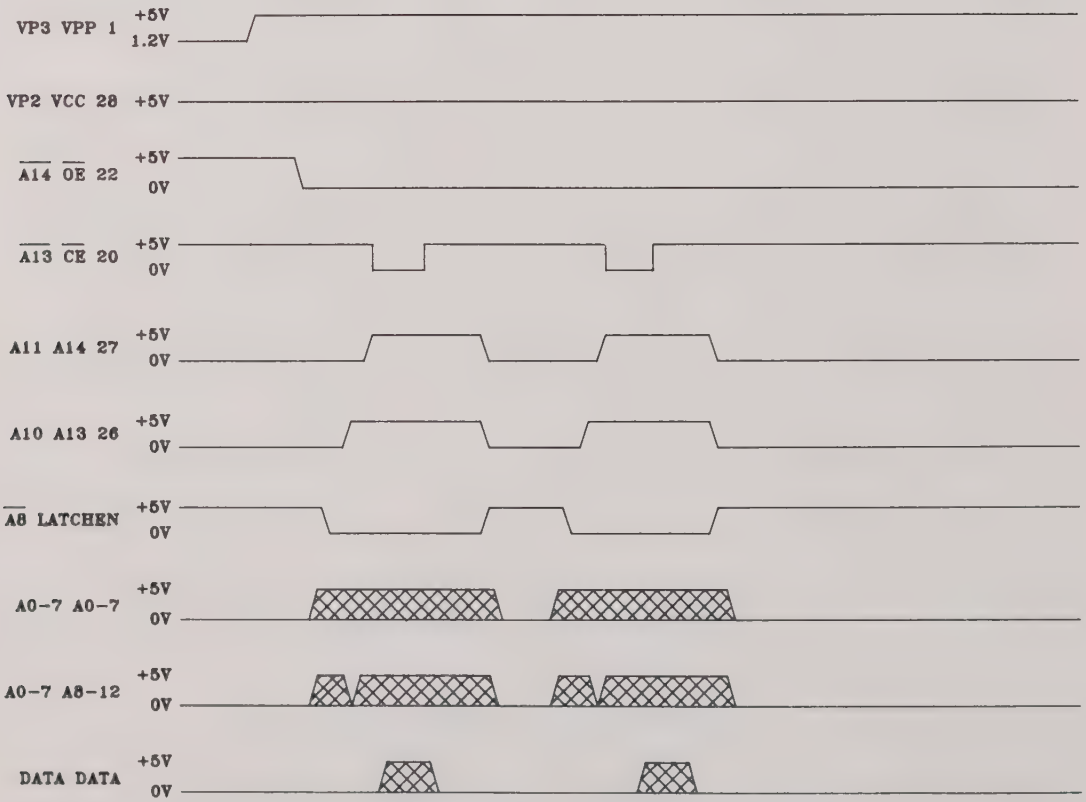


Figure 8-3. Timing Diagram for the 2764/27128

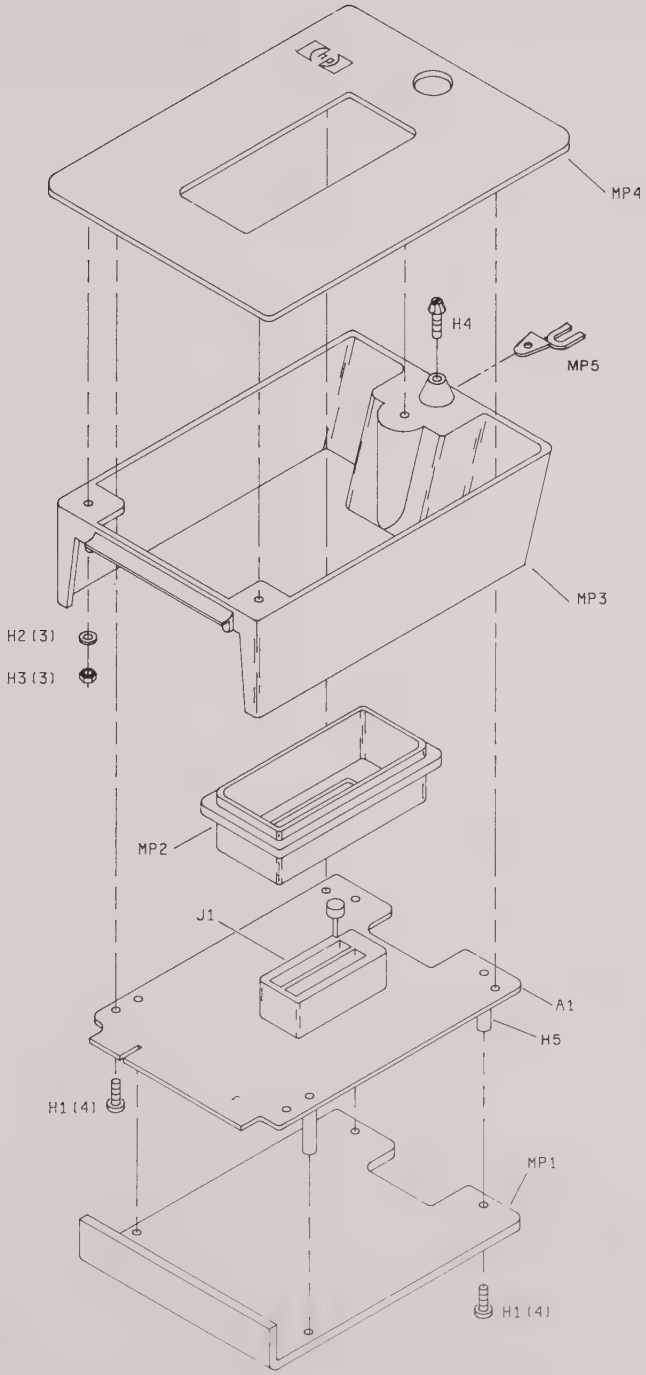


Figure 8-4. Model 64515C Illustrated Parts Breakdown

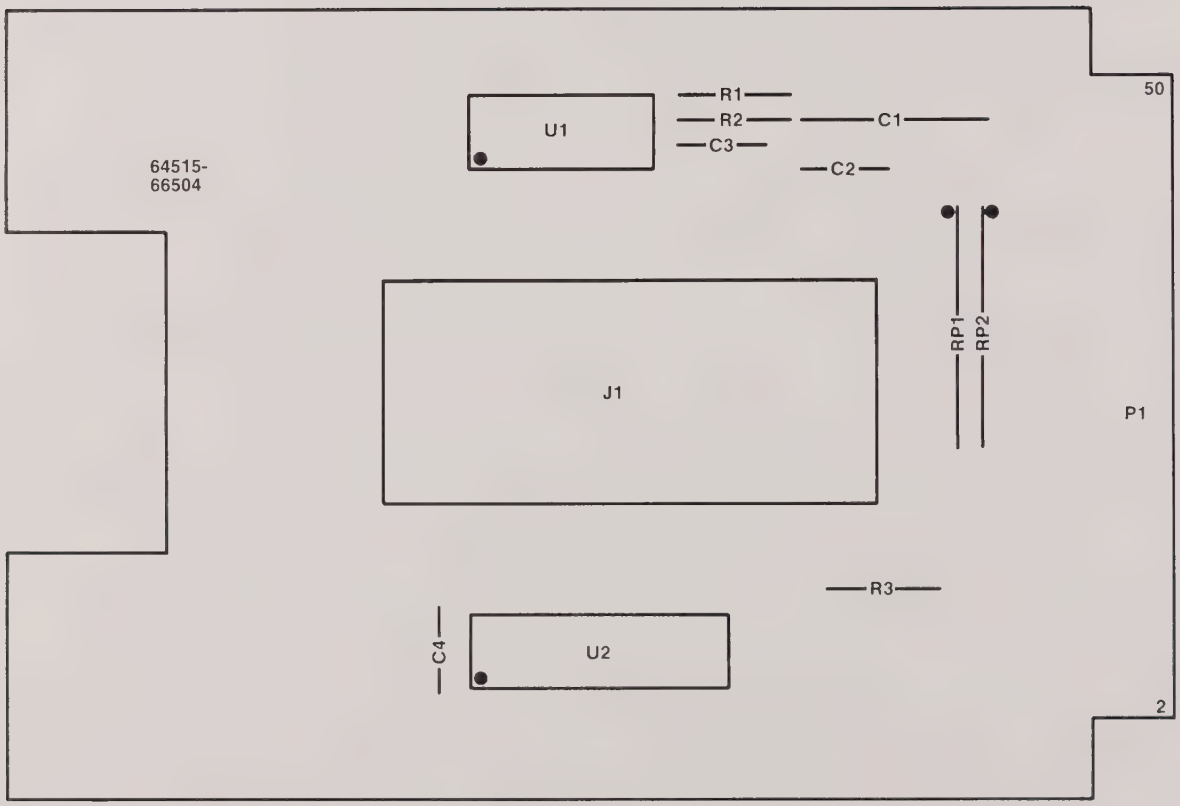
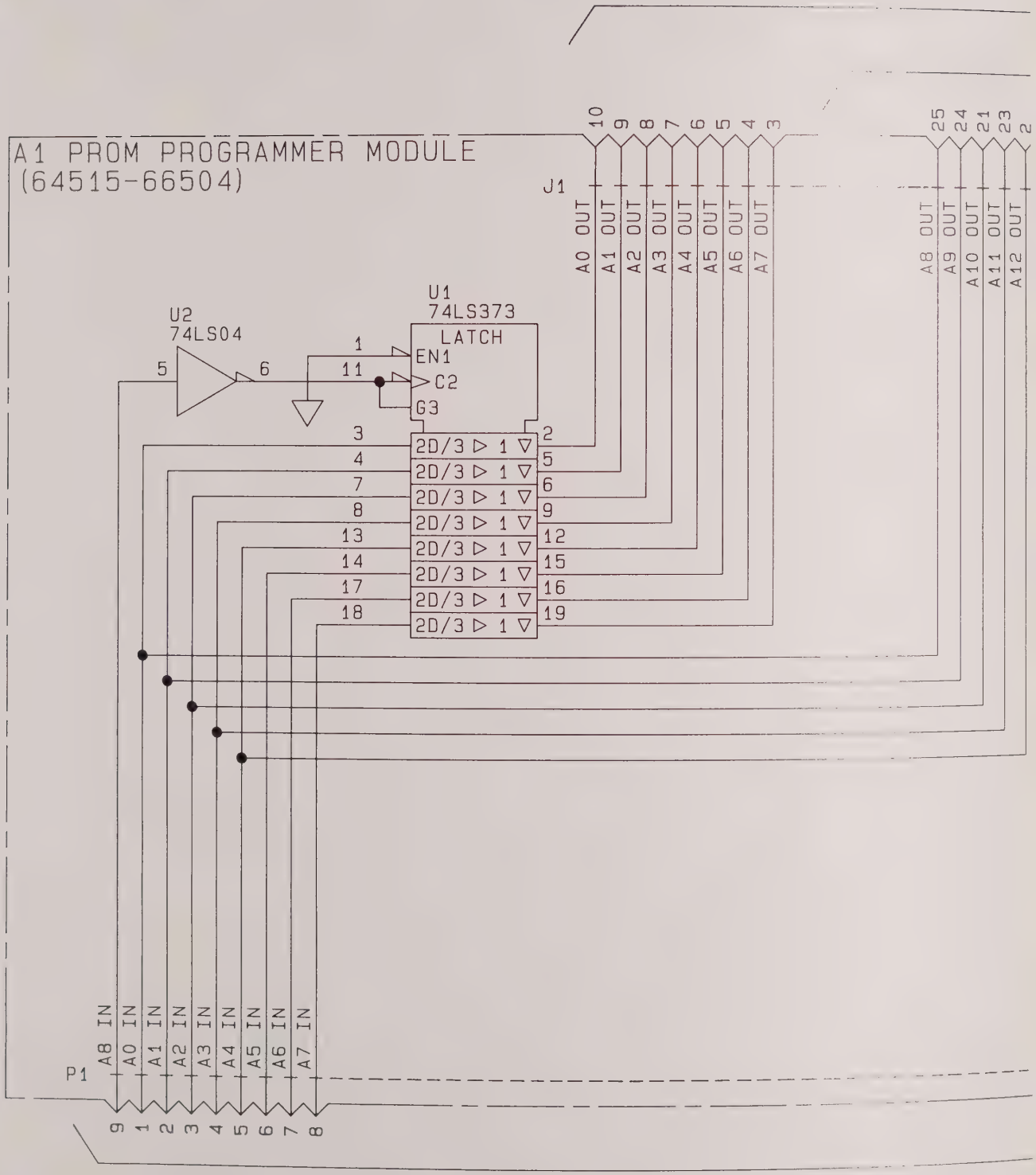
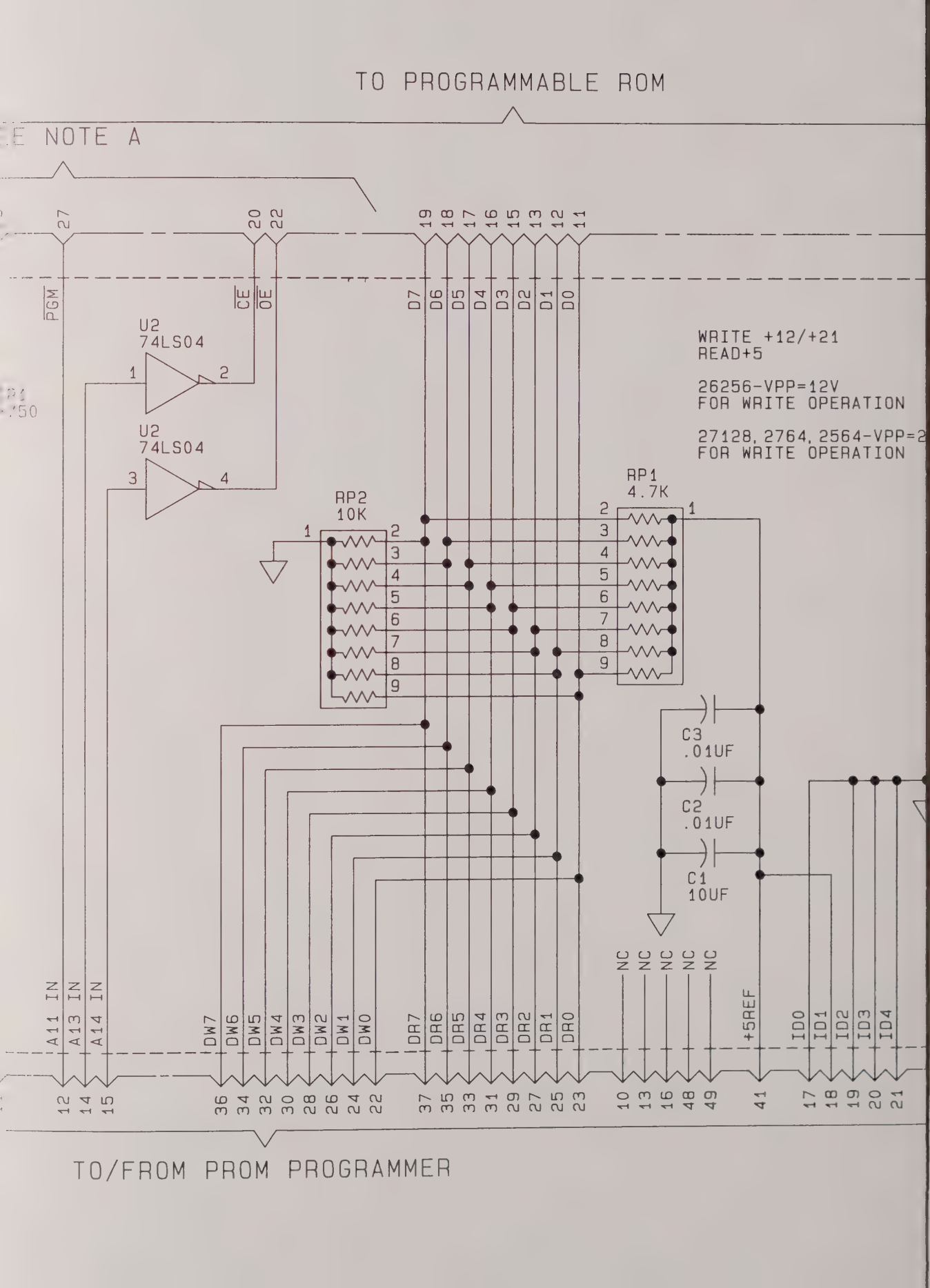
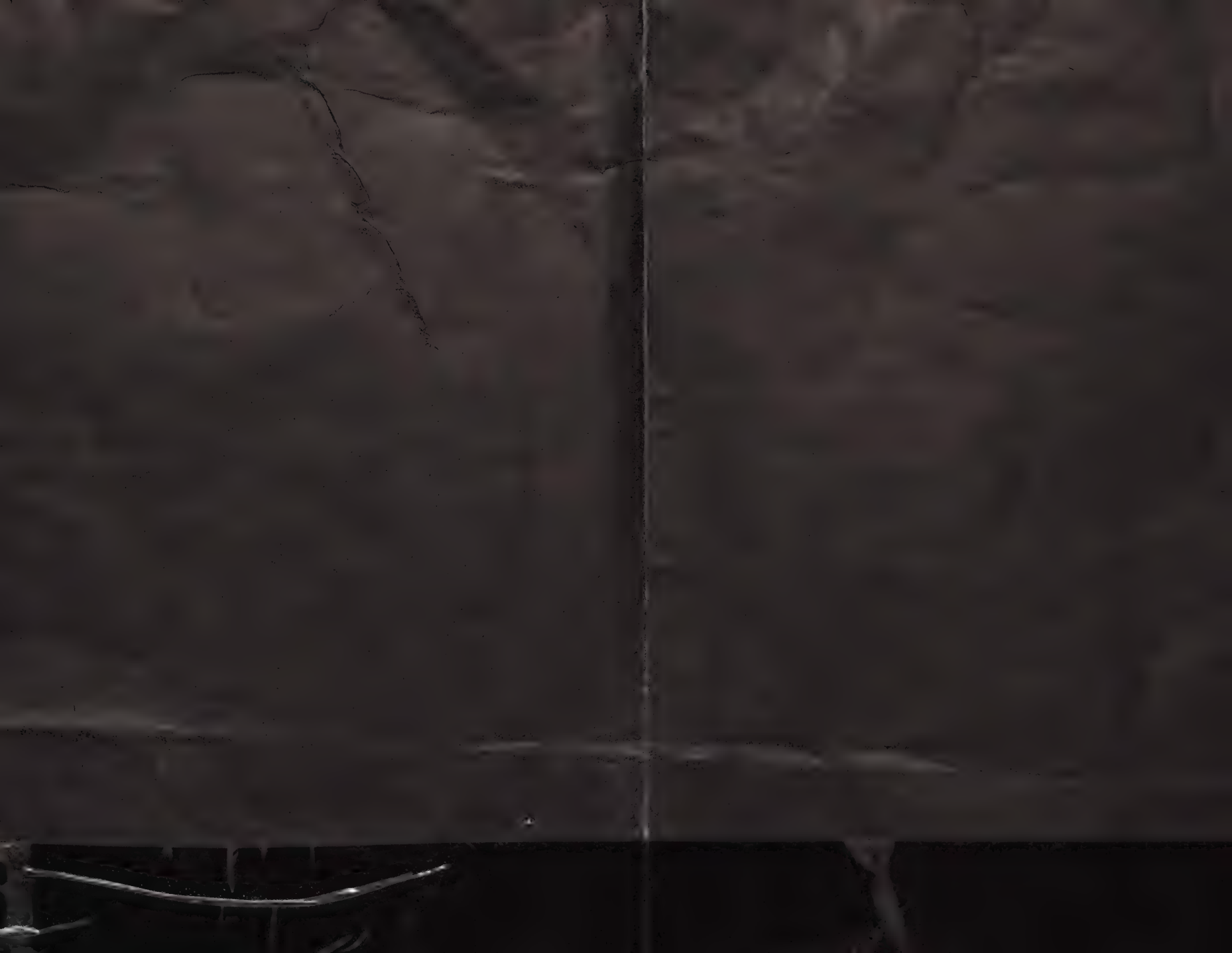
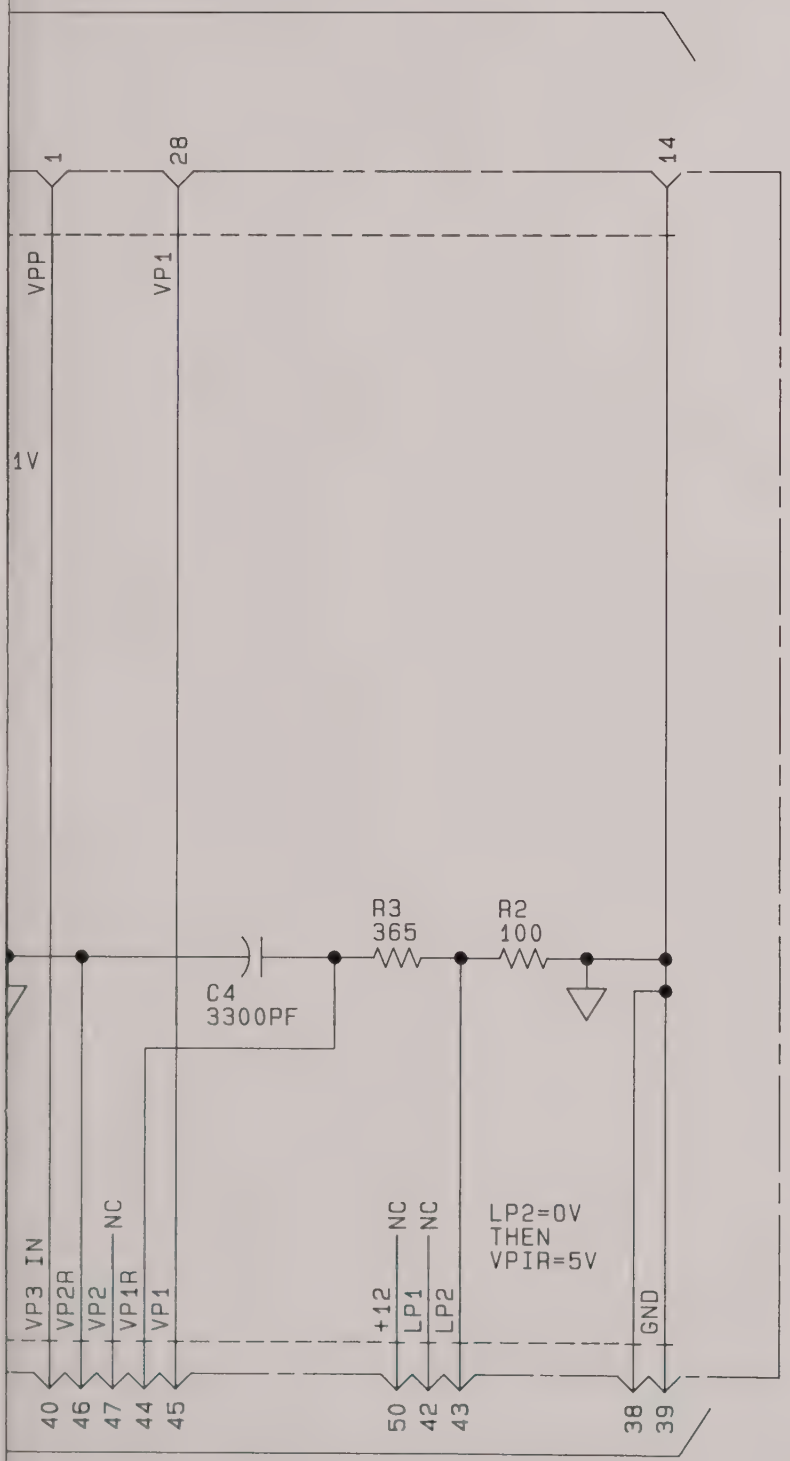


Figure 8-5. Model 64515C Component Locator


A1 PROM PROGRAMMER MODULE
(64515-66504)
J1
10
9
8
7
6
5
4
3
25
24
21
23
2
A0 OUT
A1 OUT
A2 OUT
A3 OUT
A4 OUT
A5 OUT
A6 OUT
A7 OUT
A8 OUT
A9 OUT
A10 OUT
A11 OUT
A12 OUT
U1
74LS373
LATCH
EN1
C2
G3
U2
74LS04
1
11
5
6
3
4
7
8
13
14
17
18
2D/3 ▷ 1 ▽
2
5
6
9
12
15
16
19
P1
A8 IN
A0 IN
A1 IN
A2 IN
A3 IN
A4 IN
A5 IN
A6 IN
A7 IN
9
1
2
3
4
5
6
7
8


TO PROGRAMMABLE ROM
E NOTE A
27
20
22
19
18
17
16
15
13
12
11
PGM
CE
OE
D7
D6
D5
D4
D3
D2
D1
D0
U2
74LS04
U2
74LS04
WRITE +12/+21
READ+5
26256-VPP=12V
FOR WRITE OPERATION
27128, 2764, 2564-VPP=2
FOR WRITE OPERATION
RP2
10K
RP1
4.7K
C3
.01UF
C2
.01UF
C1
10UF
A11 IN
A13 IN
A14 IN
DW7
DW6
DW5
DW4
DW3
DW2
DW1
DW0
DR7
DR6
DR5
DR4
DR3
DR2
DR1
DR0
NC
NC
NC
NC
NC
+5REF
ID0
ID1
ID2
ID3
ID4
12
14
15
36
34
32
30
28
26
24
22
37
35
33
31
29
27
25
23
10
13
16
48
49
41
17
18
19
20
21
TO/FROM PROM PROGRAMMER





ICs ON THIS SCHEMATIC

Ref Desig	HP Part No.	Mfr Part No.
U1	1820-2102	74S373
U2	1820-1149	74S04

PARTS ON THIS SCHEMATIC

C1-4
J1
R1-3
RP1,2
U1,2

NOTE "A"

IC	Pin	To Function
2764	22	OE
	20	CE
	27	PGM
	26	NC
	2	A12
	23	A11
	21	A10
2564	22	PD/PGM
	20	A11
	27	CS2
	26	Vcc
	2	CS1
	23	A12
	21	A10
27128	22	OE
	20	CE
	27	PGM
	26	A13
	2	A12
	23	A11
	21	A10
27256	22	OE
	20	CE
	27	A14
	26	A13
	2	A12
	23	A11
	21	A10

POWER CONFIGURATION

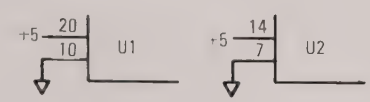


Figure 8-6.
Model 64515C Schematic
PROM MOD 8-11

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..	Support only for specific product line

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A,C,E

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CH,CS,E

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GREECE

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Telex: 215962 RKAR GR
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PLAISIO S.A.
G. Gerardos
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P

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GUATEMALA CITY
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Telex: 66678 HEWPA HX
Cable: HEWPACK HONG KONG
E,CH,CS,P

CET Ltd.
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199-203 Hennessy Rd.
*Wanchia, **HONG KONG***
Tel: 5-729376
Telex: 85148 CET HX
CM

Schmidt & Co. (Hong Kong) Ltd.
Wing On Centre, 28th Floor
Connaught Road, C.
HONG KONG
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A,M

ICELAND

Elding Trading Company Inc.
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*IS-**REYKJAVIK***
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M

INDIA

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Prabhadevi
***BOMBAY** 400 025*
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A,M

Blue Star Ltd.
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Prabhadevi
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A,CH,CM,CS,E,M

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Cable: BLUE STAR
A

Blue Star Ltd.
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A,M

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A

Blue Star Ltd.
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A,E

Blue Star Ltd.
T.C. 7/603 Poornima
Maruthankuzhi
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E

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P

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A,CS,E,M
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M

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P

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Northrop Instruments & Systems Ltd.
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OMAN

Khimjil Ramdas
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MUSCAT
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Telex: 3289 BROKER MB MUSCAT
P

Suhail & Saud Bahwan
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Telex: 3274 BAHWAN MB

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Mushko & Company Ltd.
Oosman Chambers
Abdullah Haroon Road
***KARACHI** 0302*
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Telex: 2894 MUSKO PK
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A,E,M,P

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Electrónico Balboa, S.A.
Calle Samuel Lewis, Ed. Alfa
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PANAMA 5
Tel. 64-2700
Telex: 3483 ELECTRON PG
A,CM,E,M,P

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Arranged alphabetically by country

PERU

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***LIMA** 1*
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CM,E,M,P

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The Online Advanced Systems Corporation
Rico House, Amorsolo Cor. Herrera Street
Legaspi Village, Makati
P.O. Box 1510
Metro MANILA
Tel: 85-35-81, 85-34-91, 85-32-21
Telex: 3274 ONLINE
A,CH,CS,E,M

Electronic Specialists and Proponents Inc.
690-B Epifanio de los Santos Avenue
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P.O. Box 2649 Manila
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Telex: 40018, 42000 ITT GLOBE MACKAY BOOTH
P

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Mundinter
Intercambio Mundial de Comércio S.A.R.L.
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P-LISBON
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Telex: 16691 munter p
M

Soquimica
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*1298 **LISBOA** Codex*
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Telex: 13316 SABASA
P

Telectra-Empresa Técnica de Equipmentos Eléctricos S.A.R.L.
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QATAR

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P

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Telex: 4156 EASTEC DH

Nasser Trading & Contracting
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DOHA
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Telex: 4439 NASSER DH
M

SAUDI ARABIA

Modern Electronic Establishment
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AL-KHOBAR
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CH,CS,E,M,P

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CH,CS,E,M,P

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CH,CS,E,M,P

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CM

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CH,CM

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A,CS,MS,P

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CH,P

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